

## CLAIMS

What is claimed is:

1. The method of building and transferring a tread belt structure on a portable and collapsible building drum mounted carefully on a building machine with a rotatable shaft; comprises the steps of
  - forming the annular tread belt on the building drum;
  - transferring the building drum with tread belt from the rotatable shaft onto a pivoting transfer device;
  - pivoting the transfer device about 90° rendering the tread belt and building drum's axis perpendicular to a horizontal plane;
  - collapsing the building drum;
  - separating the annular tread belt from the building drum
  - removing the tread belt
  - expanding the building drum;
  - pivoting the building drum into co-axial alignment with the rotatable shaft;
  - moving the building drum onto the shaft.
2. The method of claim 1 wherein the steps of forming the annular tread belt includes the steps of:
  - applying at least one first tread rubber layer as a plurality of first tread strips onto the rotating building drum;
  - applying one or more cord reinforced layers over the at least one first tread rubber layer while rotating the building drum; and
  - winding one or more layers of tread rubber onto the underlying cord and rubber layers to form the tread belt structure.
3. The method of claim 2 further comprises the step of weighing the building drum as the tread belt is being formed annularly.

4. The method of claim 3 further comprises adjusting the amount of elastomeric material to be applied to form the tread belt to match the weight or volume at a known specific gravity of the elastomeric material to the predetermined specification weight or volume.
5. The method of claim 4 further comprises the step of forming the elastomeric layers by calendering or extruding strips of unvulcanized rubber at the tread building machine and applying the layers or strips while hot onto the building drum.
6. The method of claim 5 further comprises the step of controlling the elastomeric gauge of the material as a function of monitored weight at the building drum.
7. The method of forming a spirally wound belt layer comprises the steps of:
  - feeding two or more cord wires through a die;
  - extruding elastomeric material through the die to encapsulate the two or more cord wires;
  - applying the encapsulated two or more cord wires onto a building drum and spirally winding to form a layer.
8. A method of removing a tread belt from a radially collapsible building drum comprises the steps of:
  - rotating the building drum having a tread belt applied rendering the tread belt and building drum's axis perpendicular to a horizontal plane;
  - grasping the tread belt along the lower lateral edges using a pick-up means;
  - applying a force to effectively zero balance the weight of the tread belt prior to collapsing the building drum;
  - collapsing the building drum; and
  - removing the tread belt.
9. An apparatus for building and transferring a tread belt reinforcing assembly comprises:

a drive means for rotating a building drum, the drive means including a drum supporting shaft;

a building drum;

a weight sensor connected to the drum supporting shaft.

10. The apparatus for building and transferring a tread belt reinforcing assembly of claim 9 further comprises:

a computer controlled means for adjusting the amount of material being applied to the building drum, the computer controlled means analyses the weight sensor data to directly increase or decrease the material.

11. The apparatus for building and transferring a tread belt reinforcing assembly of claim 10 further comprises at least one means for forming strips of elastomeric material to be applied to the building drum, the means being controlled by the computer control means.

12. An apparatus for building and transferring a tread belt reinforcing assembly comprises:

a drive means for rotating a building drum, the drive means including a horizontally extending building drum supporting shaft;  
drum supporting shaft;

a radially collapsible tread belt building drum, slidably mounted on the building drum shaft;

a transfer means, the transfer means including a tread belt transfer shaft attached to a pivotably movable frame; and wherein the transfer shaft is pivoted into coaxial alignment with the building drum supporting shaft for building drum transfer and pivoted upright tread belt removal;

a means for moving the tread belt from the building drum shaft onto the transfer shaft.

13. The apparatus of claim 12 wherein the collapsible building drum has a tread belt building surface, the surface being formed by a plurality of arcuate segment assemblies, each segment assembly being radially contractible.

14. The apparatus of claim 13 wherein each segment is connected to a pair of hydraulic cylinders internally positioned between the arcuate segment and a central hub.
15. The apparatus of claim 14 wherein each segment assembly includes a trapezoidal support and an arcuate building surface, wherein each trapezoidal support has the radially inner portion narrow and the sides of the adjacent trapezoids are contacting, and the building drum arcuate segments having the inner portion narrow and the outer portion wider and the inner portion wider and the outer portion narrower in each adjacent pair.
16. The apparatus of claim 12, where the transfer means has a plurality of load cells for measuring weight.